



PATENT ABSTRACTS OF JAPAN

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(21) Application number: **10218455**(22) Date of filing: **26.06.1998**(71) Applicant: **NAGAURA YOSHIKI**(72) Inventor: **NAGAURA YOSHIKI****(54) PIEZOELECTRIC ELEMENT AND MACHINING METHOD THEREFOR****(57) Abstract:**

PROBLEM TO BE SOLVED: To obtain a vibrator thinner than the thickness of manufacturing limit or a lens-shaped lamina upper curved surface by installing a material to be polished equal to or a little lower than the height of projection from the upper surface of a first machining assisting tool upper surface of a second machining assisting tool fitted in a ring-shaped or quadrangular groove or stepped part of the upper surface of the first machining assisting tool.

SOLUTION: A second cylindrical machining assisting tool 19 a little higher than the depth of a ring-shaped or quadrangular groove or stepped part 12 formed on the upper surface of a first machining assisting tool 11 is fitted in the inside of the first machining assisting tool 11, a disc-like quartz plate 13 which is equal to or a little lower or higher than the height of projection from the first machining assisting tool 11 is installed, and the quartz plate 13, the second machining assisting tool 19 and the lower surface where the ring-shaped or stepped part 12 is formed are polished by lapping plates 17, 18. Cemented carbide or iron harder than

the quartz plate 13 is used to manufacture the second machining assisting tool 19, and a polishing agent such as cerium oxide or the like is used, whereby a smooth line of a concave lens shape can be formed.

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